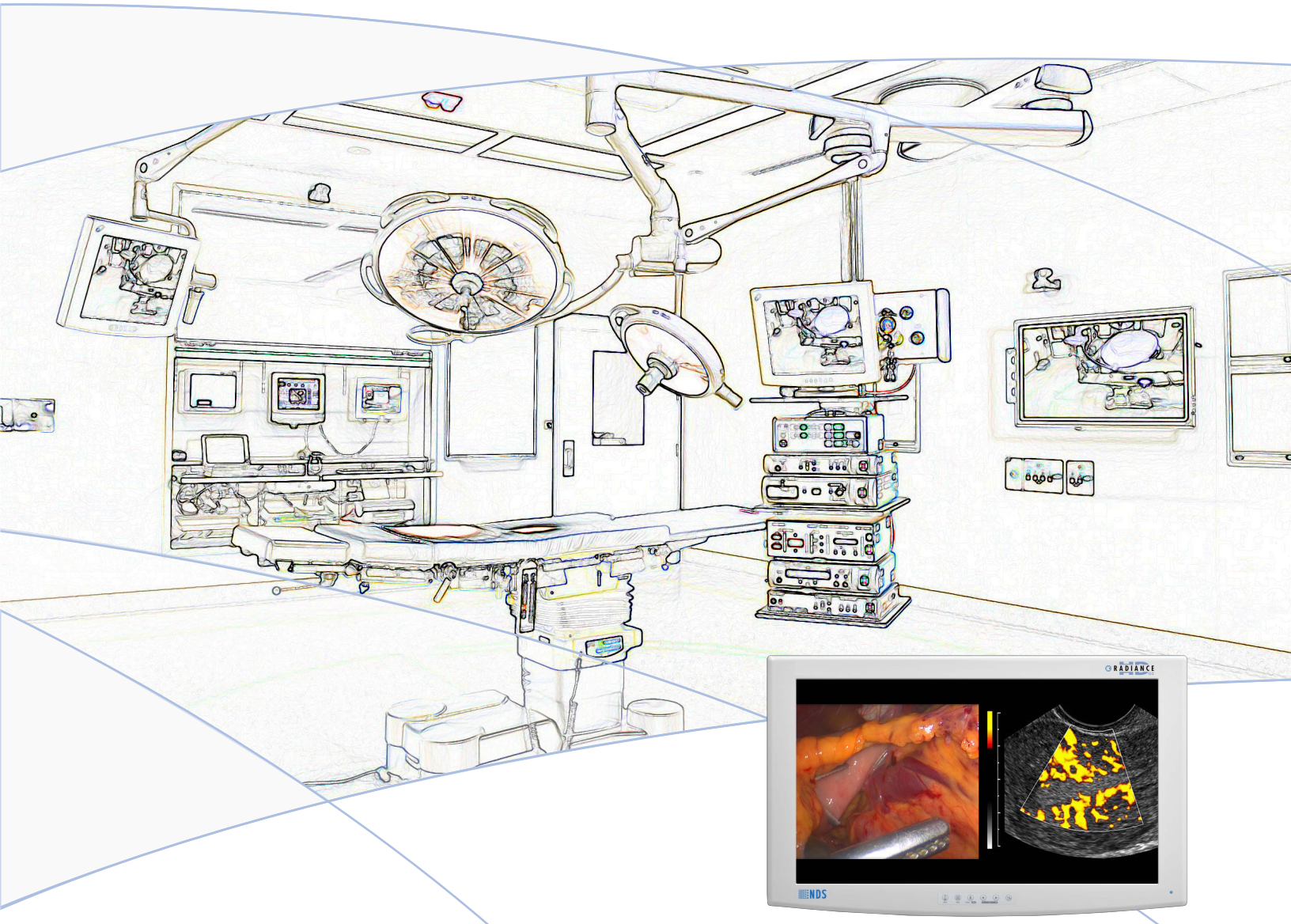
NDS
SURGICAL · IMAGING



24" RADIANCE G2

High-Definition, Multi-Modality Imaging

RADIANCE HD G2

USER MANUAL

[ENGLISH]

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1 Warnings and Cautions

This symbol alerts the user that important information regarding the installation and / or operation of this equipment follows. Information preceded by this symbol should be read carefully in order to avoid damaging the equipment.

This symbol warns user that un-insulated voltage within the unit may have sufficient magnitude to cause electrical shock. Therefore, it is dangerous to make contact with any part inside the unit. To reduce the risk of electric shock, **DO NOT** remove cover (or back). There are no user serviceable parts inside. Refer servicing to qualified service personnel.

This symbol cautions the user that important information regarding the operation and / or maintenance of this equipment has been included. Information preceded by this symbol should be read carefully to avoid damage to the equipment.

This symbol denotes the manufacturer.

This symbol denotes the manufacturer's European Community representative.

To prevent fire or shock hazards, do not expose this unit to rain or moisture. Also, do not use this unit's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted. The product is designed to meet the medical safety requirements for a patient vicinity device.
This equipment/system is intended for use by healthcare professionals only.

Safety Compliance:
This product is T.U.V. approved with respect to electric shock, fire and mechanical hazards only in accordance with CAN/CSA C22.2 No. 60601-1 and ANSI/AAMI ES60601-1.

Safety Compliance:
This product meets the requirements of EN60601-1 so as to conform to the Medical Device Directive 93/42/EEC and 2007/47/EC (general safety information).

Safety and EMI Compliance: GB9254, GB4943 and GB17625
声明
此为A级 产品。在生活环境中, 该产品可能会造成无线电干扰。在这种情况下, 可能需要用户对其干扰采取切实可行的措施。

This product complies to the above standards **only** when used with the supplied medical grade power supply.
Power Supply: SL Power Electronic Corp MW155RA2400F02
AC Input: 100 to 240 Volts at 50 to 60 Hz.
DC Output: 24 volts at 5 amps
Power Cord: Use a hospital grade power cord with the correct plug for your power source.
Disconnect the power cord from the AC mains. The power cord is the only recognized disconnect device.
The MEDICAL EQUIPMENT should be positioned so that its disconnect device is readily accessible.

The product should be powered from a center tapped circuit when used in the US at voltages over 120 volts. Product is intended for continuous operation.

This product is energized from an external electrical power source for class 1 equipment. It is the responsibility of the installer to test the product's earth ground to verify that it complies with the hospital, local and national impedance requirements.

A ground post, located on the back of the product, may be used for the purpose of grounding the unit's chassis. Any such ground must be installed in accordance with applicable electrical codes. The ground post is shown on the mechanical drawing found on page 2.

Recycling:

Follow local governing ordinances and recycling plans regarding the recycling or disposal of this equipment.

Declarations of Conformity

FCC and Council Directives of European Standards:

This device complies with Part 15 of FCC rules and 93/42/EEC and 2007/47/EC of the Council Directives of European Standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable results.

1. Use the attached specified cables with the color product so as not to interfere with radio and television reception. Use of other cable and adapters may cause interference with other electronic equipment.
2. This equipment has been tested and found to comply with the limits pursuant to FCC part 15 and CISPR 11. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

IEC:

This equipment has been tested and found to comply with the limits for medical devices to the IEC 60601-1-2. These limits are designed to provide reasonable protection against harmful interference in a typical medical installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to other devices in the vicinity.

FCC, Council Directives of European Standards and IEC:

There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult your dealer or an experienced radio/TV technician for help.

Accessory equipment connected to this product must be certified according to the respective IEC Standards (i.e., IEC 60950-1) for data processing equipment and IEC 60601-1 for medical equipment. Furthermore, all configurations shall comply with the system standard, IEC 60601-1-1. Anyone who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible that the system complies with the requirements of system standard IEC 60601-1-1. Whoever is responsible for securing the unit to a system needs to insure that the mounting equipment used with this product complies to IEC standard 60601-1. If in doubt, consult the technical services department or your local representative.

Legal Statement

NDS sells its products through other medical device manufacturers, distributors and resellers and therefore, purchasers of this NDS product should consult with the entity through which this product was originally purchased regarding the terms of any applicable product warranties provided by such entity, if any.

NDS neither assumes nor authorizes any person to assume for it any other liabilities in conjunction with and/or related to the sale and/or use of its products. To ensure proper use, handling and care of NDS products, customers should consult the product specific literature, instruction manual, and/or labeling included with the product or otherwise available.

Customers are cautioned that system configuration, software, the application, customer data and operator control of the system, among other factors, affect the product's performance. While NDS products are considered to be compatible with many systems, specific functional implementation by customers may vary. Therefore, suitability of a product for a specific purpose or application must be determined by the consumer and is not warranted by NDS.

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About This Manual

2

This manual is designed to assist the user with proper installation, setup and operation of the display. Depending on the model and options that were purchased, some of the features and options in this manual may not apply to the display you are using.

A numbered tab on the side of the page denotes the beginning of a section.

The functional descriptions in this manual are representative of:

Part Numbers: 90R0063, 90R0064, 90R0065, 90R0066 & 90R0067
Firmware BIOS: 58J0086 Version A and later.

Manual Part Number: 60G0489 Rev B

Intended Use and Contraindications

Intended Use:

This monitor is intended for use in a medical environment to display high quality video and graphic images .

Contraindications:

The monitor may not be used in the presence of flammable anesthetics mixture with air, oxygen or nitrous oxide.

No part of this product may come in contact with a patient. Never touch the product and a patient at the same time.

This product is capable of displaying Radiology (PACS) images for reference, not diagnostic, purposes only.

For mission critical applications, we strongly recommend that a replacement unit be immediately available.

Image Retention Notice

Warning: Repeatedly leaving a static image on the display for long periods of time can result in image retention on the LCD screen. To prevent this phenomenon avoid leaving a fixed image on the screen and power off the monitor when not in use.

Quick Startup

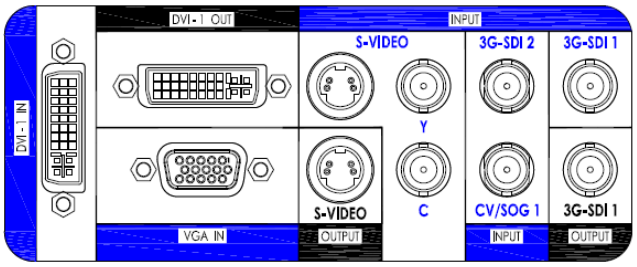
Powering On The Unit:

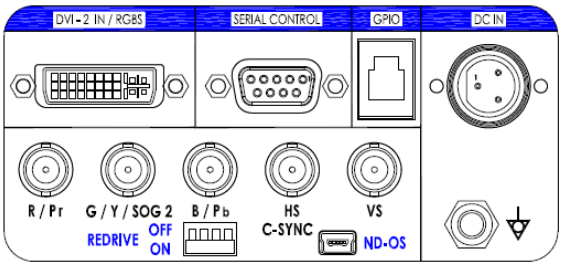
Connect the power supply to the display via the power plug. Plug in the AC adapter. Connect a video source to the display. Apply power to the peripheral device, then to the display. The NDS logo is displayed, followed shortly by video.

The electronics, designed by NDS, incorporates proprietary SmartSync™ technology which at initialization, examines the incoming signal and automatically displays the video image in its proper format. This eliminates adjustments for most video sources. To fine tune the image, please refer to “Image Adjustments” on page 5.

First time users and initial test:

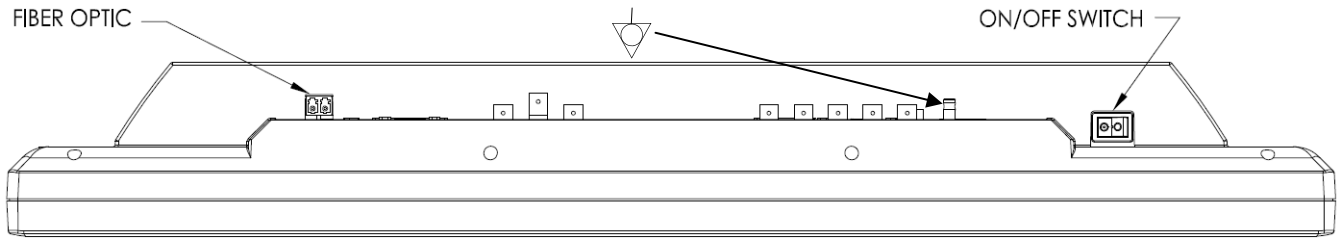
Visually, Flat-Panel (LCD) images will look crisper than those of a traditional CRT. For the same reason, live video may appear a little blocky. Users not familiar with the image differences should familiarize themselves before utilization in a critical application and determine its usability. It is recommended that first time users view the display next to a CRT to familiarize themselves with any subtle differences in viewing quality.





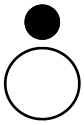
Notes

1. An **S-Video** signal may be applied via 2 BNC terminated cables to the **Y** and **C** labeled BNC connectors or a **DIN 4** terminated cable, but not both.
2. **DVI 1 IN** 1920 x 1200 maximum resolution. **DVI 2 IN** 1920 x 1080 maximum resolution.
3. **3G-SDI 1** and **3G-SDI 2** accept 3G-SDI signals. The provided accessory cable is not 3G-SDI compliant.
4. An **RGBS**, **YPbPr** or **VGA** signal may be applied via the **DVI 2** connector or the **R / Pr** , **G / Y / SOG 2**, **B / Pb** and **HS / C-SYNC** BNC connectors. The **VS** BNC is used when the applied signal has both H sync and V sync.
5. Set the **REDRIVE** switch to Off when the RGBS and YPbPr signals will not be daisy chained to another display. The **REDRIVE** switch is set to On when the RGBS and YPbPr signals will be daisy chained to a second display.
6. **DVI 1**, **3G-SDI 1** and **S-VIDEO** re-drives are always active when the display is powered on.
7. **FIBER OPTIC** (90R0064& 90R0066 only) and **DVI 1** inputs may be connected simultaneously, but may not be displayed simultaneously.
8. The **ND-OS** connector allows BIOS upgrades to be installed quickly. BIOS upgrades may also be installed via the **SERIAL CONTROL** connector. Installing the BIOS via the **Serial Control** connector will take considerably longer than installing it via the **ND-OS** connector.



Electrical Symbols

Equipotentiality:
This symbol appears next to the display's potential equalization connector. (ground post)



Open (Off) Switch:
This symbol appears on the open, or off, side of the display's rocker switch.

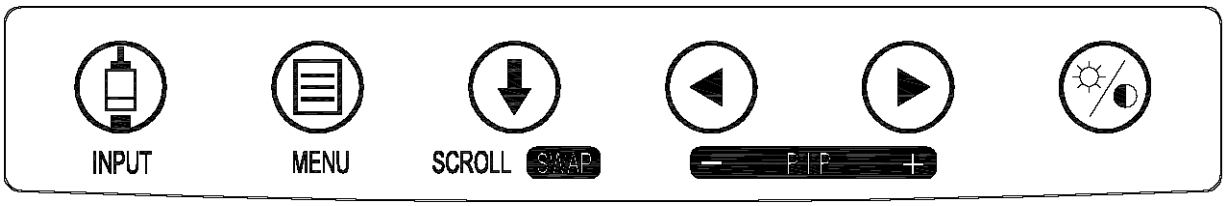
Closed (On) Switch:
This symbol appears on the closed, or on, side of the display's rocker switch.

Touch Screen Option

If the Touch Screen option is installed, please refer to the included driver and user manual CD for touch driver installation, setup and operation guide.

Control

A 6 button keypad, located bottom center on the front of the display, allows the user to make adjustments to various display parameters using the On Screen Menu (OSM) system. To display the standard input menu, press the **INPUT** button twice.



Quick Select

The **QUICK SELECT** menu, shown below, is displayed when the keypad's **INPUT** button is pressed once. If the current input is one of the five shown in the **QUICK SELECT** menu, it will be illuminated. Select one of these inputs by pressing the keypad button under the **QUICK SELECT** key that points to it. For example: To select DVI-1, press the **MENU** button under the **DVI-1** label. If a selection is not made the **QUICK SELECT** menu closes after 10 seconds. The **QUICK SELECT** menu closes 30 seconds after the last selection is made. **Quick Select** changes only the Primary input. If a Secondary input is being displayed and the input chosen with **Quick Select** is the same as the Secondary input, then the PIP image will be cleared and the chosen input will become the Primary input.

Accessing the full input menu is described on page 7.

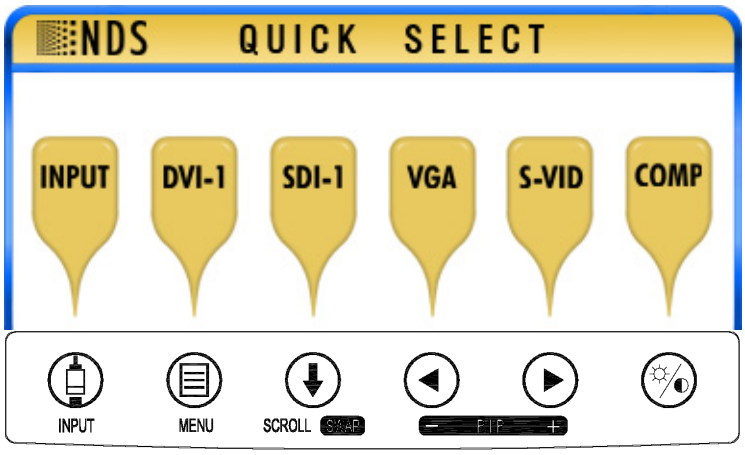
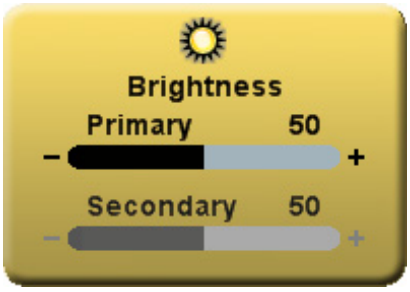


Image Adjustments

Press this keypad button to adjust the **Brightness**, **Contrast** and / or the **Backlight** settings.

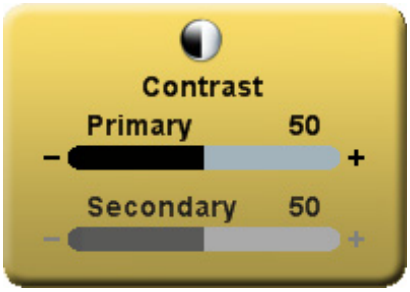
Adjust Brightness



Press the **Brightness / Contrast** button to display the **Brightness** control. Press the ◄ or ► button to adjust Primary brightness. When a PIP image is visible, press the **Brightness / Contrast** button again to access the Secondary brightness control.

Setting the brightness too high or too low will decrease the amount of visible grayscales.

Adjust Contrast



Press the **Brightness / Contrast** button twice, three times when a PIP image is visible, to display the **Contrast** control. Press the ◄ or ► button to adjust Primary contrast. When a PIP image is visible, press the **Brightness / Contrast** button again to access the Secondary contrast control.

Setting the contrast too high or too low causes loss of some grayscales. Color saturation may appear incorrect.

Adjust Backlight

Press the **Brightness / Contrast** button three times, five times when a PIP image is visible, to display the **Backlight** control. Press the ◄ or ► button to set the backlighting.

Note: Lowering the backlight level will increase the backlight lifetime.

Menu System Overview

Press the **MENU** button once to open the On Screen Menu System (OSM). The primary and secondary inputs are shown at the top of the menu.

1. The Picture menu is displayed when the OSM is opened.

Press the ◄ or ► button to select the menu you want to work with, then press the **SCROLL** button to select the parameter. Press the ◄ or ► button to set the parameter to the desired value. Press the **MENU** button to save your changes and close the Menu System.

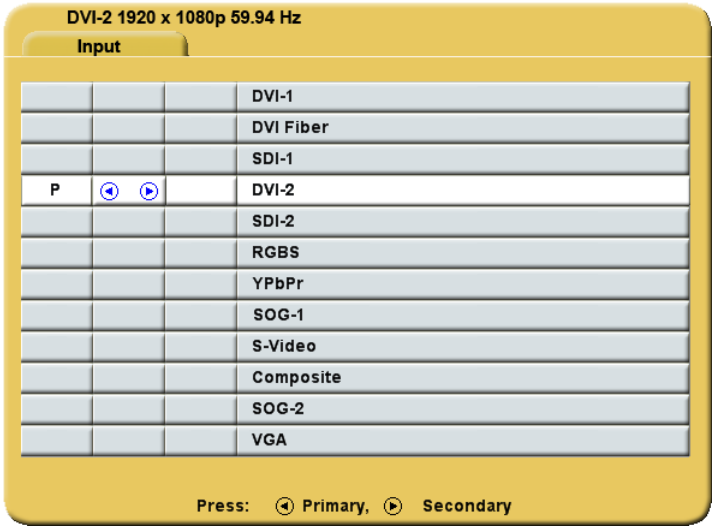
Notes:

1. All parameter names change to the language selected in the Setup menu.
2. Grayed out parameters are not currently accessible.

Languages: English, Deutsch, Français, Italiano, Svenska, Español, Nederlands, Русский

Video Source

Inputs Menu



Press the **INPUT** button twice to open the input menu. The Input menu shows a: **P** for primary input in the left most column and an: **S** for secondary input in the column to the right of the cursor. Press the **SCROLL** button to highlight the desired input. Finally, press ◄ button to make it the primary input or press ► to make it the secondary input. The secondary input may be cleared by highlighting it using the **SCROLL** button and pressing the ► button. Selecting a secondary input is optional. **Note:** Grayed out inputs are not accessible.

The Input menu will automatically turn off 30 seconds after the most recent button press. It may also be turned off by pressing the Input button.

The table below shows which inputs may be secondary when a given input is primary. Inputs marked with a √ in the secondary column may be designated as the secondary input. Inputs marked with an **X** in the secondary column may not be designated as the secondary input. The gray cells denote those inputs that share a common connector or common electronics and thus may not used simultaneously.

DVI 2, RGBS, **YPbPr** and **SOG 2** share the same input. Thus if one is selected as the primary input, the others may not be selected as secondary. The same is true for **Composite, SOG 1** and **VGA**.

	Input	Secondary											
		DVI 1	DVI Fiber	SDI 1	SDI 2	DVI 2	RGBS	YPbPr	SOG 2	S-Video	Composite	SOG 1	VGA
Primary	DVI 1			√	√	√	√	√	√	√	√	√	√
	DVI Fiber			√	√	√	√	√	√	√	√	√	√
	SDI 1	√	√		√	√	√	√	√	√	√	√	√
	SDI 2	√	√	√		√	√	√	√	√	√	√	√
	DVI 2	√	√	√	√					√	√	√	√
	RGBS	√	√	√	√					√	√	√	√
	YPbPr	√	√	√	√					√	√	√	√
	S-Video	√	√	√	√	√	√	√	√		X	√	√
	Composite	√	√	√	√	√	√	√	√	X			√
	SOG 1	√	√	√	√	√	√	√	√	√			X
	SOG 2	√	√	√	√					√	√	√	√
	VGA	√	√	√	√	√	√	√	√	√	√	X	

PIP and Swap

Selecting a secondary input will display a small image of the secondary source in the upper right corner of the display.

Secondary Image Size Control

The size of the secondary image is controlled by pressing ◄ or ► buttons. Pressing the ► button will cycle through:

Small PIP = Width of secondary image is 25% of total screen width.
Large PIP = Width of secondary image is 40% of total screen width.
Split-Screen = Primary and Secondary have equal width side by side (half of screen width).
Split-Screen Overscan = Primary and Secondary have equal width with overscan applied
Full Screen Primary = No secondary image displayed.

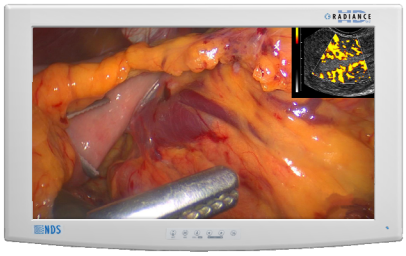
The images at the bottom of the page illustrate the above sequence.

Pressing the ◄ button will cycle through the above sizes in reverse order.

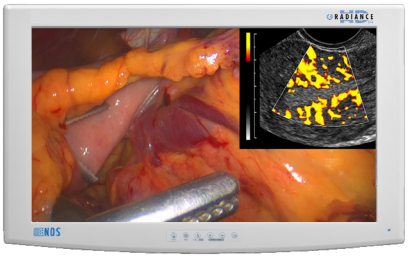
Pressing the **SCROLL / SWAP** button will exchange the primary and secondary inputs, and exchange their respective locations on the display. Pressing the button a second time will restore the inputs to their original primary/secondary status. It is not necessary for both images to be displayed in order to swap primary and secondary images.

Secondary image size and image swapping may also be controlled via the GPIO port. GPIO details are on page 9 and the GPIO connector pin out is described on page 19.

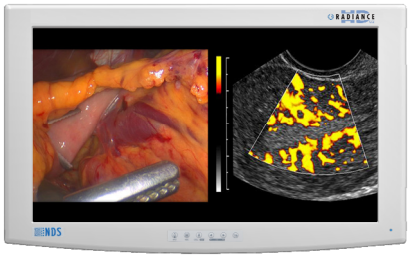
Small PIP



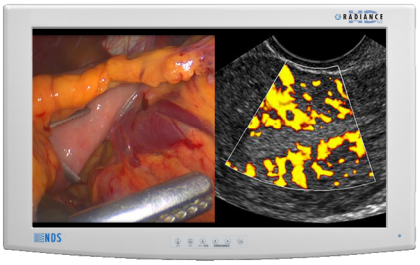
Large PIP



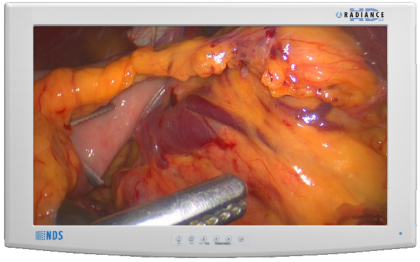
Split Screen



Split Screen Overscan



Full Screen Primary

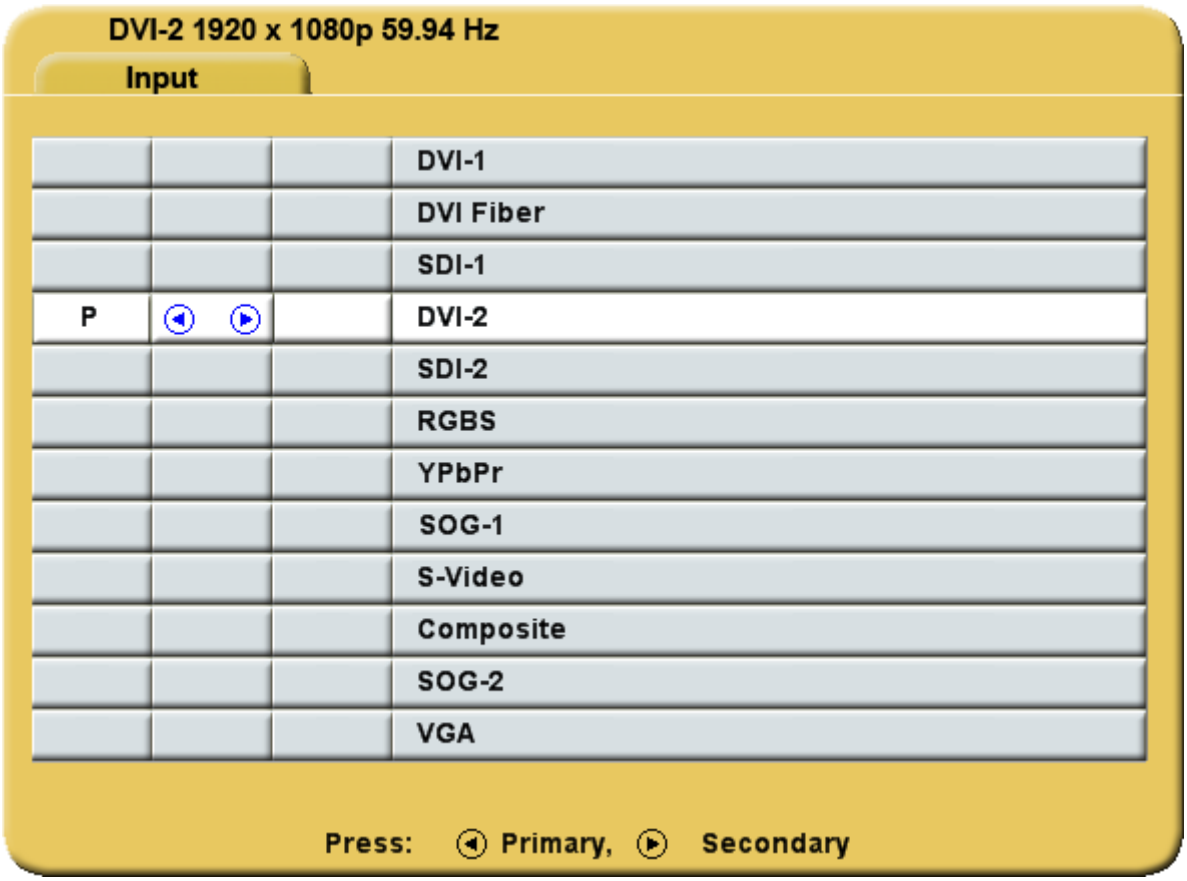


GPIO

General Purpose Input Output (GPIO):

The GPIO control allows the user to step through the Secondary image sizes as described on page 8, swap the Primary and Secondary images or display a Record indicator in the upper left corner of the display.

Refer to the Input Menu shown below when setting up the Primary and Secondary inputs.



GPIO Primary / Secondary Source Setup:

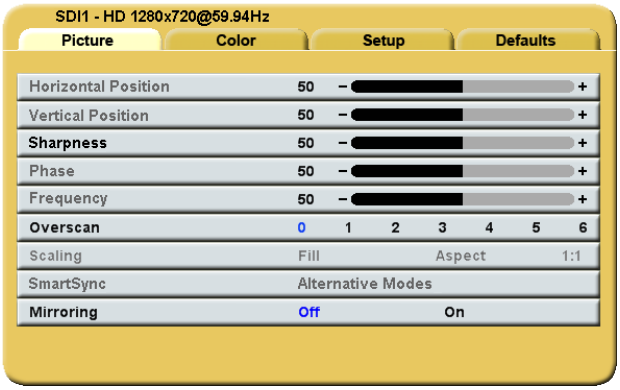
1. Press the **INPUT** button twice to open the Input Menu.
2. Press the **SCROLL** button to highlight the input that will be designated as Primary.
3. Select it by pressing the ◄ button a **P** appears in the column to the left of the cursor**.**
4. After the Primary input is chosen you may designate a Secondary input.
5. Press the **SCROLL** button to highlight the input that will be designated as Secondary.
6. Select it by pressing the ► button an **S** appears in the column to the right of the cursor. The selected Secondary input appears as a small PIP in the upper right corner of the display.
7. The Secondary input may be cleared by highlighting it using the **SCROLL** button and pressing the ► button again.

Using GPIO Control Fixture:

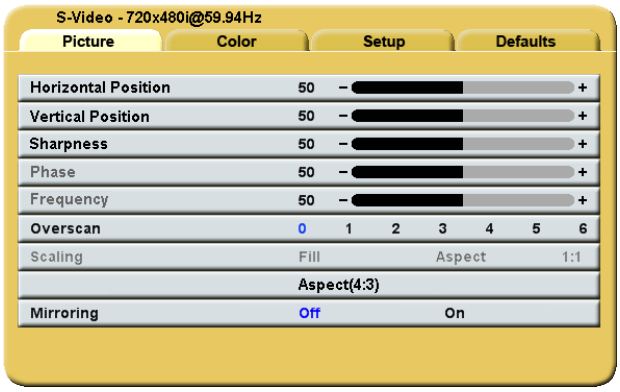
1. Connect an appropriately wired fixture to the **GPIO** connector.
2. Press the fixture's PIP Size button.
3. The display will cycle through the PIP sizes. See page 8 for the sequence.
4. Press the fixture's **Swap** button. The Primary and Secondary images swap locations
5. Press the fixture's **Record** button, the Record indicator is displayed until the **Record** button is released.

Note: GPIO connector pin out is on page 19.

HD-SDI Picture Menu



SD-SDI, S-Video and Composite Picture Menu



Horizontal Position (SD-SDI, S-Video and Composite only):

This control is disabled when Overscan is set to 0.
Moves the image to the left or right. Press ◄ or ► to horizontally center the image.

Vertical Position (SD-SDI, S-Video and Composite only):

This control is disabled when Overscan is set to 0.
Moves the image up or down. Press ◄ or ► to vertically center the image.

Sharpness:

Press ◄ or ► to adjust the sharpness (focus) of the displayed image.

Overscan:

0 = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◄ or ► buttons.

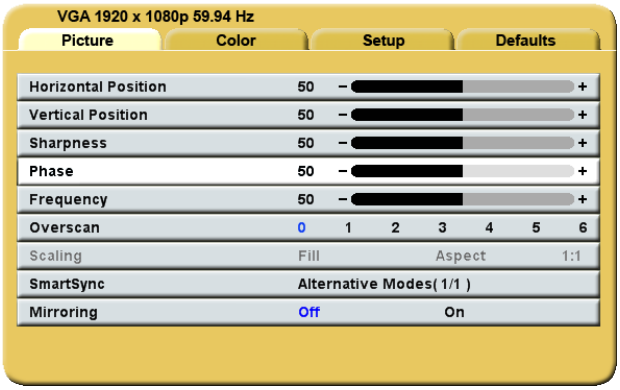
Aspect (SD-SDI, S-Video and Composite only):

Pressing the ◄ or ► button changes the aspect ratio of the image from **4:3** to **16:9** or from **16:9** to **4:3**. **Note:** Displaying a **4:3** image in **16:9** causes its elements stretched horizontally. Likewise, displaying a **16:9** image in **4:3** causes its elements to be compressed horizontally.

Mirroring:

Pressing the ◄ or ► button presents the displayed image swapped from right to left and displays a mirroring indicator in the lower right corner. Pressing the ◄ or ► button again returns the image to its normal left to right orientation and removes the mirroring indicator

VGA,SOG, RGBS and YPbPr Picture Menu



Horizontal Position:
Moves the image to the left or right. Press ◄ or ► to horizontally center the image.

Vertical Position:
Moves the image up or down. Press ◄ or ► to vertically center the image.

Sharpness:
Press ◄ or ► to adjust the sharpness (focus) of the displayed image.

Phase:
Press ◄ or ► to adjust the phase of the display's pixel clock.

Frequency:
Adjusts the frequency of the display's pixel clock. With Scaling set to **Fill** adjust until image just fills the screen horizontally. Press ◄ or ► to adjust the frequency of the display's pixel clock.

Scaling (Graphics):
This parameter is enabled when the input signal is not 16:9, not interlaced and not 480P or 576P.
Fill = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed. **Aspect** = Expands the video image until its largest dimension fills the screen. Image may be displayed with black bars on the top and bottom or the left and right. **1:1** = Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◄ or ► buttons.

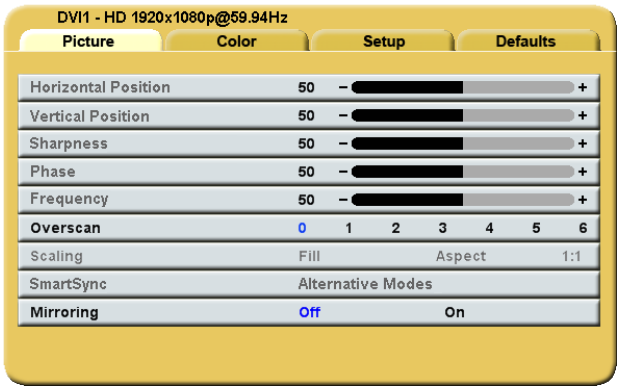
Overscan (Video):
This parameter is enabled when the input is 16:9 or 480P or 576P or interlaced.
0 = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◄ or ► buttons.

SmartSync / Alternative Modes
On initialization NDS' proprietary **SmartSync** technology examines the incoming signal and automatically displays the video image in its proper format. To run **SmartSync** highlight the **SmartSync / Alternative Modes** parameter and press the ◄ button.

To select an alternate mode (format) highlight the **SmartSync / Alternative Modes** parameter and press the ► button. The mode increments each time the ► button is pressed until the selected mode equals the maximum available, the next time ► pressed the first mode is restored. **Alternative Modes** are used to manually distinguish between modes (resolutions) whose timing characteristics are very close.

Mirroring:
Pressing the ◄ or ► button presents the displayed image swapped from right to left and displays a mirroring indicator in the lower right corner. Pressing the ◄ or ► button again returns the image to its normal left to right orientation and removes the mirroring indicator

DVI Digital Picture Menu



Overscan (Video)

This parameter is enabled when the input is 16:9 or 480P or 576P or interlaced.
0 = The image is displayed at a size that fills the screen without losing any video information. The image presented to the display may include black bars top and bottom or left and right.
1, 2, 3, 4, 5 or **6** = The image is linearly enlarged, while remaining centered, in incremental steps. As the image becomes larger video information will be lost from the top and bottom and / or left and right. Select using ◄ or ► buttons.

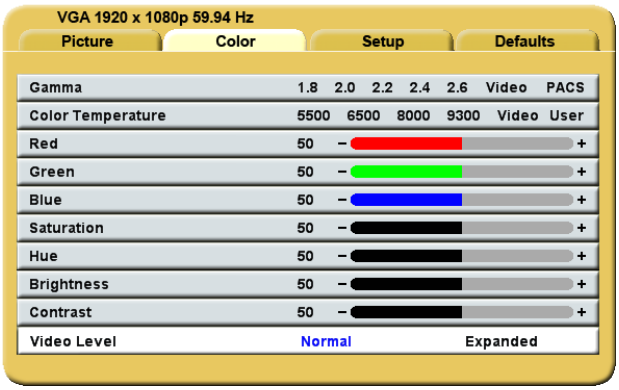
Scaling (Graphics)

This parameter is enabled when the input signal is not 16:9, not interlaced and not 480P or 576P.
Fill = Expands the video image to fill the entire screen. The aspect ratio may not be accurately displayed.
Aspect = Expands the video image until its largest dimension fills the screen. Image may be displayed with black bars on the top and bottom or the left and right. **1:1** = Displays the video data in its native size and aspect ratio. Image may be displayed with black bars on the top and bottom and on the left and right. Select using ◄ or ► buttons.

Mirroring:

Pressing the ◄ or ► button presents the displayed image swapped from right to left and displays a mirroring indicator in the lower right corner. Pressing the ◄ or ► button again returns the image to its normal left to right orientation and removes the mirroring indicator

Color Menu



Gamma:
Press ◄ or ► to select a preset **Gamma** (1.8, 2.0, 2.2, 2.4 or 2.6), Video or PACS

Notes:

1. Video is a color corrected Look Up Table (LUT).
2. PACS is a DICOM-like LUT. **Note:** This product is capable of displaying Radiology (PACS) images for reference, not diagnostic, purposes only.

Color Temperature:
Press the ◄ or ► button to select a preset color temperature. **Note:** When a preset is selected and any parameter is changed, the current values are copied to the User presets and User is selected.

Red, Green, Blue:
Press the ◄ or ► button to increase or decrease the intensity of the selected color.

Saturation:
Press ◄ or ► to set the saturation (color intensity) of the image.

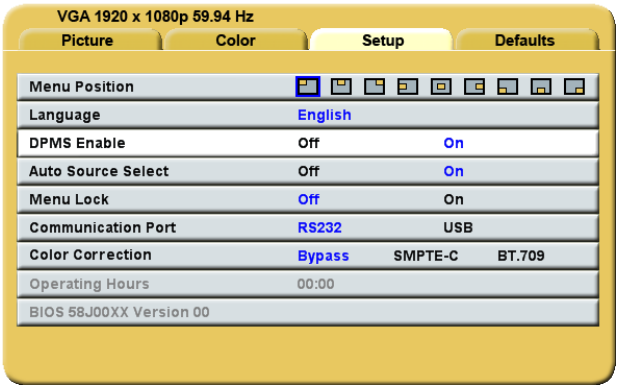
Hue:
Press ◄ or ► to set the hue (color tint) of the image.

Brightness:
Press the ◄ or ► button to adjust brightness. This is a duplicate of the Brightness control described on page 5.

Contrast:
Press the ◄ or ► button to adjust contrast. This is a duplicate of the Contrast control described on page 5.

Video Level:
Normal: Provides a dynamic range equivalent to the incoming signal with no change.
Expanded: Expands the signal level such that an input signal with range 16 (black) to 235 (white) will be expanded to a range of 0 (black) to 255 (white). **Note:** If a signal is already full range (0 to 255), changing the setting to Expanded will cause the signal to “clip” or “saturate”.
Press the ◄ or ► button to select.

Setup Menu



Menu Position:
Places the menu in 1 of 9 predefined screen positions. Press the ◄ or ► button to select any of the 9 screen positions.

Language:
Selects 1 of 8 languages: English, Deutsch, Français, Italiano, Svenska, Español, Nederlands, Русский. Press the ◄ or ► button to select any of the 8 languages.

DPMS Enable:
Display Power Management System. When DPMS is enabled (**on**), and no input signal is present, a "D.P.M.S" message is displayed for 10 - 15 seconds, after which the display shuts down. The display turns on when the input signal is restored. Press the ◄ or ► button to disable or enable DPMS.

Auto Source Select:
on = Searches through all possible input sources until an active video source is found. **off** = Video input is manually selected. Press the ◄ or ► button to disable or enable Auto Source Select.

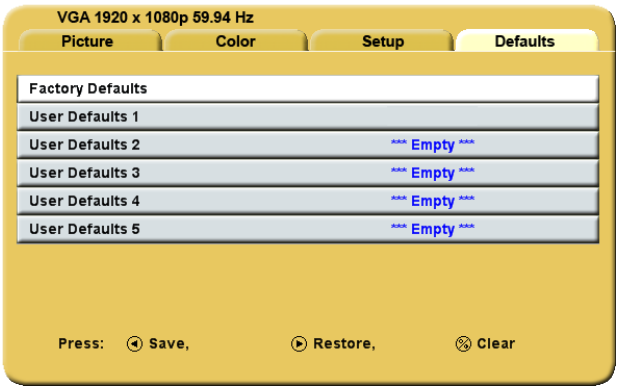
Menu Lock:
Disables access to menu system. This prevents inadvertent changes to the display's settings. To enable Menu Lock, press the ► button. MENU LOCKED is displayed when the ◄ button is pressed. To unlock, simultaneously press and hold the MENU and SCROLL buttons until MENU UNLOCKED is displayed.

Communication Port:
This parameter allows the user choose between the display's **RS-232** port or its **USB** (ND-OS) port for controlling the display.

Color Correction:
Alters the display's color gamut to match the SMPTE-C (Standard Definition) or BT.709 (High Definition) color standard.
Bypass: Color correction is bypassed.
SMPTE-C: Matches the color gamut to the SMPTE-C standard.
BT.709: Matches the color gamut to the BT.709 standard.
Press the ◄ or ► button to select the required standard or bypass Color Correction .
If the Color Correction feature is not installed this parameter cannot be selected.

Operating Hours: Backlight hours of operation.
BIOS: Version of the display's BIOS firmware.

Defaults Menu



Factory Defaults:

Displays Restoring Factory Defaults message and returns all settings to their factory preset values. Press the SCROLL button to highlight Factory Defaults, then press the ► button.

User Defaults:

Allows up to five customized user setting profiles to be saved.

Setting User Defaults

1. Set the Primary and Secondary inputs, PIP size, Picture, Color and Setup parameters to the user's preferences.
2. Select the Defaults tab.
3. Use the SCROLL button to select an available User Defaults. ***EMPTY*** appears in available User Defaults.
4. Press the ◄ to save the user's settings. The ***EMPTY*** message will be removed, see User Defaults 1 in the above OSM illustration.
5. Repeat steps 1 thru 4 for up to 5 users.

Restoring User Defaults

1. Select the User Defaults to be restored, then press the ► button .

Clearing User Defaults

1. Select the User Defaults to be cleared, then press the Brightness / Contrast button .

Troubleshooting Section

Image Size is Very Large for the Screen:

If the computer data does not appear to be the correct format, then SmartSync must be run. To run SmartSync, press the Menu button. Select the Setup menu. Press SCROLL to highlight SmartSync, then press the ◄ button. SmartSync will run and size the image properly.

Ghosting in Characters:

Ghosting in characters is usually attributed to reflections in the video cable or source. Use a high quality coaxial cable and, if possible, lower the vertical refresh rate. Lower scan rates can help eliminate reflections. Unlike a CRT a flat-panel will not flicker at lower refresh rates (60 Hz is optimal) and data update will be the same at all refresh rates.

Text is Too Small:

Since the monitor accepts and displays computer data with a higher resolution than the display's native resolution, this may produce small text. In the Menu check the Display Mode tab. Verify that the computer data resolution does not exceed the Native Resolution specification shown on page 20.

Character Jitter:

If text characters seem to be "shaky" or bold, then Sharpness, Frequency and / or Phase may require adjusting. See: *Setting Frequency, Phase and Sharpness* below.

Character Noise and Vertical Distortion:

The Frequency adjustment expands or contracts the horizontal size of the displayed image. The displayed image may be too wide or too narrow and vertical banding and pixel jitter may appear in grays and light colors. Adjust the Frequency until the image just fits the screen. Horizontal position adjustment can be used to verify that Frequency is set correctly. Line up the image on the left edge of the screen and then shift by one "click" to the right. The image should have one column off the screen on the right side if the Frequency is set correctly.

Black Screen:

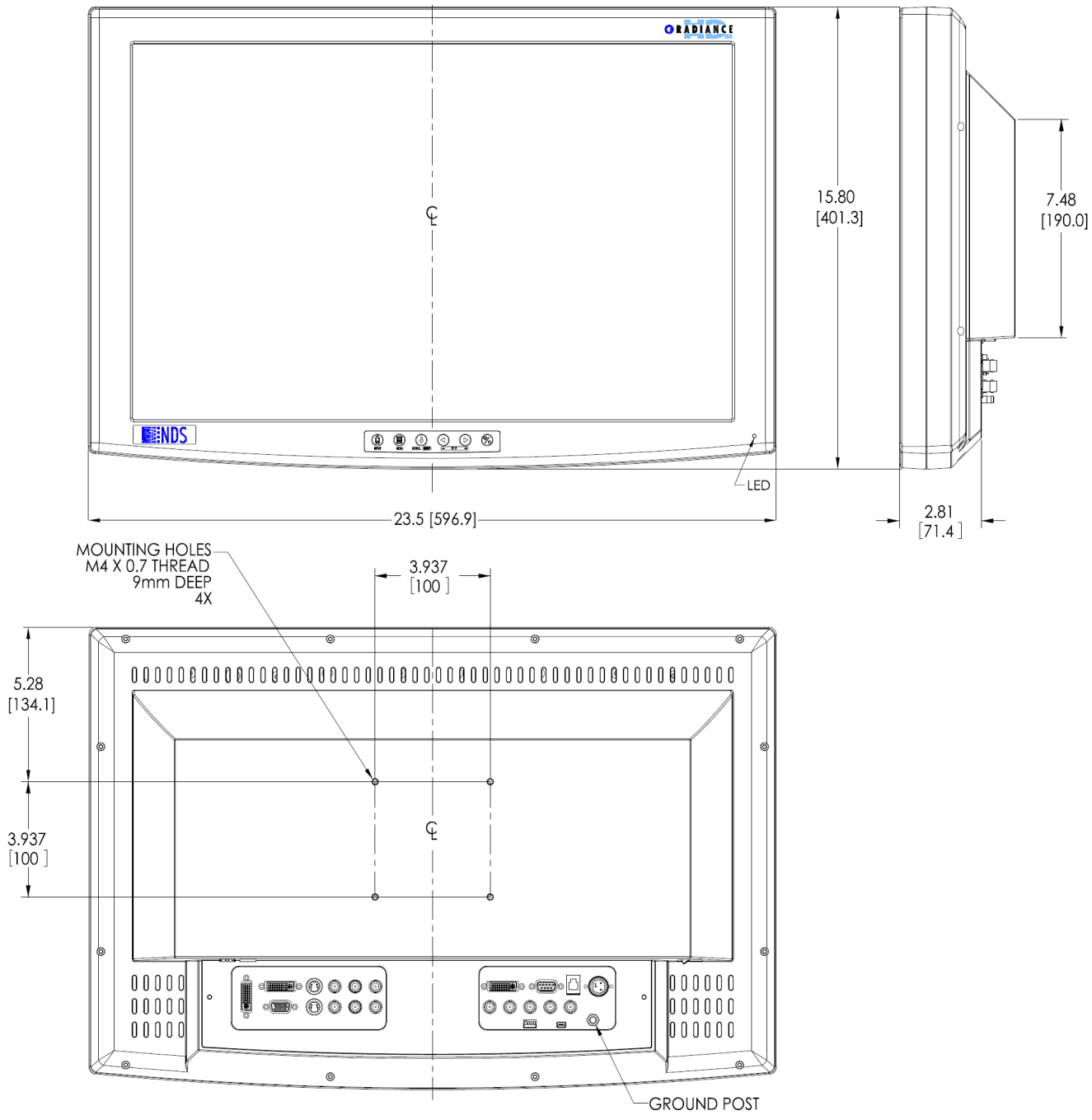
Power the display Off and On. If the NDS logo appears then the display is working properly. Check if the power management feature (DPMS) is enabled. A "Searching" message appears in the lower right hand corner when the video source is not present.

Setting Frequency, Phase and Sharpness:

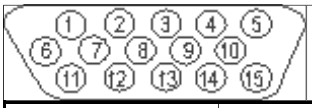
Windows Users: Open a WordPad document and set the font to Arial 8. Press the enter key to move the cursor to the middle of the page. Hold the shift and + keys down to create a line of +s.

If the + signs appear in groups of light or dark, then the Frequency is not correct. Press the **MENU** button to open the OSM, then **SCROLL** to the Frequency parameter. Press the ◄ or ► buttons to increase or decrease frequency. There will be a point were all the + signs snap into focus and are the same intensity.

Phase and Sharpness are subtle adjustments and are best set using a display calibration program.


RADIANCE
NDS
15.80
[401.3]
7.48
[190.0]
LED
23.5 [596.9]
2.81
[71.4]
MOUNTING HOLES
M4 X 0.7 THREAD
9mm DEEP
4X
3.937
[100]
5.28
[134.1]
3.937
[100]
GROUND POST

Data Connectors and Pin Outs



VGA

1 RED	6 GND RED	11 N. C.
2 GREEN	7 GND GREEN	12 DDC_SDA
3 BLUE	8 GND BLUE	13 HORIZ SYNC
4 N.C.	9 +5VDC	14 VERT SYNC.
5 GND	10 SYNC GND	15 DDC_SCL

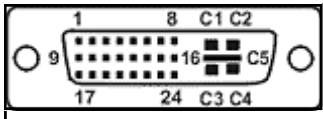
S-Video

Pin	Name	Description
1	GND	Ground (Y)
2	GND	Ground (C)
3	Y	Intensity (Luminance)
4	C	Color (Chrominance)

Serial Control

Pin	Name	Description
1	NC	No Connection
2	RXD	Receive Data, Touch Screen option
3	TXD	Flash, Touch Screen, and Serial Control Tx
4	NC	No Connection
5	GND	Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	RXD	Flash Upgrade and Serial Control Rx

Note: The following cables are available from NDS.
1. Flash Upgrade Cable order part number: 35Z0009

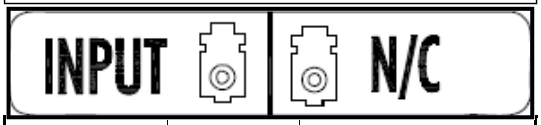


DVI-I*
Digital and Analog .

DVI-I Supports digital **and** analog (RGBS / YPbPr).
Analog data appears on pin 8 and pins, C1 through C5.
* Compliant with DVI 1.0

PIN#	SIGNAL	PIN#	SIGNAL
1	T.M.D.S. DATA 2-	**16**	HOT PLUG DETECT
2	T.M.D.S. DATA 2+	**17**	T.M.D.S. DATA 0-
3	T.M.D.S. DATA 2/4 SHIELD	**18**	T.M.D.S. DATA 0+
4	T.M.D.S. DATA 4-	**19**	T.M.D.S. DATA 0/5 SHIELD
5	T.M.D.S. DATA 4+	**20**	T.M.D.S. DATA 5-
6	DDC CLOCK	**21**	T.M.D.S. DATA 5+
7	DDC DATA	**22**	T.M.D.S. CLOCK SHIELD
8	ANALOG VERT. SYNC DVI 2 Only	**23**	T.M.D.S. CLOCK+
9	T.M.D.S. DATA 1-	**24**	T.M.D.S. CLOCK-
10	T.M.D.S. DATA 1+		**DVI2 Only**
11	T.M.D.S. DATA 1/3 SHIELD	**C1**	ANALOG RED
12	T.M.D.S. DATA 3-	**C2**	ANALOG GREEN
13	T.M.D.S. DATA 3+	**C3**	ANALOG BLUE
14	+5V POWER	**C4**	ANALOG HORIZ SYNC
15	GND	**C5**	ANALOG GROUND

90R0064 and 90R0066 Only



Pin	Name	Description
Input	Input	Serial Video Data
N/C		No Connection

Cable Bend Radius

We recommend that the bend radius of metallic cables be no less than 2.5 inches (63 mm) or 7 times the diameter of the cable whichever is greater. The bend radius of Fiber Optic cables should be no less than 10 times the diameter of the cable. Sharper bends may damage the cable and / or degrade the video signal.

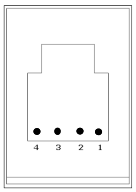
GPIO Connector and Pin Out

General Purpose Input and Output (GPIO)

Swap:
Closing the Swap Pin to GND swaps the position and size of the Primary and Secondary images. See page 8 for details.

PIP Size:
The size of Secondary image increases each time the PIP Size is connected to GND. See page 8 for details.

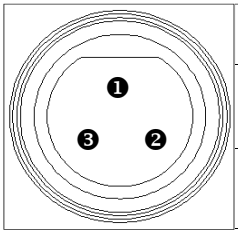
Record Indicator:
The Record Indicator is displayed while a contact closure to the GND is present, the indicator is removed when the contact is opened. The Record Indicator is displayed in the monitor's top left corner.



GPIO
Mating connector:
RJH 4 pin
Telephone Handset
Connector

Pin	Name	Description
1	Swap	Swap P & S inputs
2	P.S.	PIP Size.
3	R.I.	Record Indicator.
4	GND	Common Ground

Power Connectors and Pin Outs



24 volt connector			
Pin	1	2	3
	+ 24 VDC	GND	Shield

Specifications [a]

Model	24 Radiance G2
Viewable Diagonal (inches)	24.0
Luminance [b](cd/m^2, typical)	300
BT.709 Luminance	250
Native Resolution	1920 x 1200
Dot Pitch (mm)	.270
Vertical Viewing Angle	178°
Horizontal Viewing Angle	178°
Contrast Ratio (nominal)	1000:1
VGA Input signal level at 75 Ohms	0.7 V p-p
HD-SDI Input signal level	.8 to 2.0 V p-p
S-Video Input signal level	0.7 V p-p
Composite Input signal level	0.7 V p-p
Sync On Green (SOG)	0.7 V p-p
RGBS Input signal level	0.7 V p-p
RGBS Input Sync Level	0.4 to 4.0 V p-p
DC Power Consumption (nominal)[c]	55W
AC Power Consumption (nominal)	65W[c]
Display Weight	7.1 kg (15.7 lbs)
Environmental	
Operating Temperature	0 to 40°C
Operating Humidity (non condensing)	20 to 85%
Operating Altitude	6,600 ft (2,000 m)
Storage Temperature	-20 to 50°C
Storage Humidity (non condensing)	10 to 90%
Transport Humidity (non condensing)	10 to 90%
Storage Altitude	33,000 ft (10,000 m)

Notes:

a. Specifications are subject to change without notice. Contact factory for current specifications.
b. Brightness shown is without a Touch Screen or A/R filter installed.
c. Applies to the **SL Power Electronic Corp MW155RA2400F02** power supply provided with the display.

DVI Supported Resolutions	
Signal Parameter	Supported Range
Active Resolution	640 x 480 min to 1920 x 1200 max
(Horizontal x Vertical	
Refresh Rate	23.98 Hz up to 85 HZ
(Vertical Frequency)	
Pixel Clock	25 MHz up to 165 MHz
(Pixel Frequency)	

The DVI-D input can automatically detect any valid digital DVI signal within the resolution, vertical refresh, and pixel clock ranges specified in the table above. Signals outside of any of the specified ranges may not be supported.

SDI Supported Resolutions					
Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)
720	480i	29.97	1280	720p	59.94
720	483i	29.97	1920	1080sF	24
720	487i	29.97	1920	1080p	24
720	576i	25	1920	1080p	25
720	587i	25	1920	1080p	29.97
1280	720p	24	1920	1080i	25
1280	720p	25	1920	1080i	29.97
1280	720p	30	1920	1080p	50
1280	720p	50	1920	1080p	59.94

VGA, RGBS, and YPbPr Supported Resolutions								
Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)	Horizontal Resolution (pixels)	Vertical Resolution (lines)	Vertical Frequency (Hz)
720	480i	29.97	1024	768i	43.48	1280	1024i	43.44
720	480p	59.94	1024	768	50	1280	1024	60
720	576i	25	1024	768	59.94	1280	1024	60.02
720	576p	50	1024	768	60	1280	1024	75.02
640	350	50	1024	768	64	1280	1024	85.02
640	350	60	1024	768	70.07	1280	480p	59.94
640	350	70	1024	768	75.03	1280	576p	50
640	400	50	1024	768	84.99	1294	960	59.96
640	400	70	1152	576	50	1440	900	59.94
640	480	50	1152	864	60.05	1600	1200i	48.04
640	480	60	1152	864	70.01	1600	1200	60 *
640	480	67	1152	864	75	1920	1080sF	24
640	480	70	1152	864	85	1920	1080p	24
640	480	72.81	1152	900	66	1920	1080p	25
640	480	75	1280	720p	24	1920	1080p	29.97
640	480	85.01	1280	720p	25	1920	1080i	25
720	400	70	1280	720p	30	1920	1080i	29.97
720	400	85.04	1280	720p	50	1920	1080p	50
800	600	56.25	1280	720p	59.94	1920	1080p	59.94
800	600	60.32	1280	960i	29.97	1920	1200	30 *
800	600	60.38	1280	960	59.94	1920	1200	50 *
800	600	72.19	1280	960	60			
800	600	75	1280	960	75			
800	600	85.06	1280	960	85			

* These resolutions are <u>not</u> supported on DVI-2 or the RGB BNC connectors. They are supported on DVI-1, VGA, and SOG.

Inputs	Connector Type	Inputs	Connector Type
SDI-1, SDI-2	BNC, 75 Ohm terminated	DVI -1	DVI -D (1920 x 1200 maximum resolution)
S-video	DIN-4 or BNC x 2 (Y & C), 75 Ohm terminated	DVI –2	DVI-I (1920 x 1080 maximum resolution)
RGBS / YPbPr / VGA	DVI -2 or BNC x 5, 75 Ohm terminated	VGA	HD-15 or DVI - I
Composite / SOG	BNC, 75 Ohm terminated		
Outputs			
DVI –1	DVI-D		
SDI -1	BNC		
S-Video	DIN-4		
RGBS / YPbPr	BNC x 5 or DVI –I		

Cleaning and Disinfecting Instructions

Prior to cleaning and surface disinfection, the unit should be turned **OFF** and disconnected from its power source.

Cleaning:
Thoroughly wipe all exterior surfaces with a lint-free cloth that has been dampened with an acceptable cleaning agent. Acceptable cleaning materials are listed below. Remove residual detergent by wiping all exterior surfaces with a lint-free cloth dampened with distilled water.

Disinfecting:
Disinfect the unit by wiping all exterior surfaces with a lint-free cloth dampened with 80% Ethyl Alcohol. Allow the unit to air dry.

⚠**Cautions:**
Do not allow liquids to enter the interior of the unit, and do not permit exterior surfaces to come into contact with unacceptable solvents such as those listed below, as severe damage to the unit may result.

Acceptable Cleaning Materials:
Vinegar (distilled white vinegar, 5% acidity)
Ammonia-based glass cleaner

Acceptable Disinfecting Material:
Ethanol 80 % by volume

Unacceptable solvents:
MEK (Methyl Ethyl Ketone)
Toluene
Acetone

***Note:**
The acceptable cleaning and disinfecting materials listed above have been tested on NDS products and, when used as directed, do not harm the product's finish and or its plastic components.

Electromagnetic Compatibility (EMC) Tables

All medical electronic devices must conform to the requirements of IEC 60601-1-2. Precautions, adherences to the EMC guideline information provided in this manual and verification of all medical devices in simultaneous operation are required to ensure the electromagnetic compatibility and co-existence of all other medical devices prior to a surgical procedure.

The EMC tables on next three pages provided for your reference.

EMC Tables

Guidance and manufacturer's declaration – electromagnetic emissions		
The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that it is used in such an environment.		
Emissions	**Compliance**	**Electromagnetic environment-- guidance**
RF emissions CISPR 11	Group 1	The product uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The product is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not Applicable	
Voltage fluctuations/ flicker emissions IEC 61000 -3-3	Not Applicable	

Guidance and manufacturer's declaration 211; electromagnetic immunity			
The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that it is used in such an environment.			
Immunity test	**IEC 60601 test level**	**Compliance level**	**Electromagnetic environment guidance**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines	±2 kV for power supply lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) and neutral	±1 kV line(s) and neutral	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles <5 % U_T (>95 % dip in U_T) for 5s	<5 % U_T (>95 % dip in U_T) for 0,5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) for 25 cycles) <5 % U_T (>95 % dip in U_T) for 5s	Mains power quality should be that of a typical commercial or hospital environment. If a dips or an interruption of mains power occurs, the current of the product may be dropped off from normal level, it may be necessary to use uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	Not applicable	Not applicable
NOTE U_T is the a.c. mains voltage prior to application of the test level			

EMC Tables

Guidance and manufacturer's declaration – electromagnetic immunity

The product is intended for use in the electromagnetic environment specified below. The customer or the user of the product should assure that it is used in such an environment.

Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the product, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1{,}2\sqrt{P}$ $d = 1{,}2\sqrt{P}$ 80 MHz to 800 MHz $d = 2{,}3\sqrt{P}$ 800 MHz to 2,5 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation Distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,a should be less than the compliance level in each frequency range.b Interference may occur in the vicinity of equipment marked with the following symbol:
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	

NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the product is used exceeds the applicable RF compliance level above, the product should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the product.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the product

The product is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the product can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the product as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power (W) of transmitter	Separation distance, in meters according to frequency of transmitter		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1 At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

NDS
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